TORO®

Commercial Products

Maintenance Guide

Groundsmaster®

345/325-D

Part No. 97911SL

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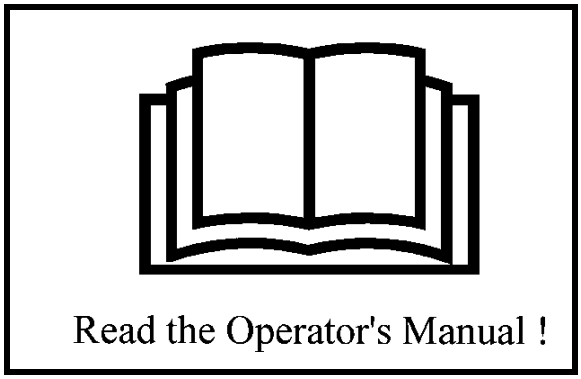

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The Groundsmaster® 300 series mower is a medium size, maneuverable, commercial rotary with over twenty years of mowing experience. During those years its design has been continuously improved for optimum productivity and durability.

GM 325-D

Features

1. Mitsubishi 3 cylinder diesel engine (25hp).
2. Sunstrand series M15 inline variable speed hydrostatic drive.
3. Hydraulic power steering.
4. Available in 2wd and 4wd versions.

GM 345

Features

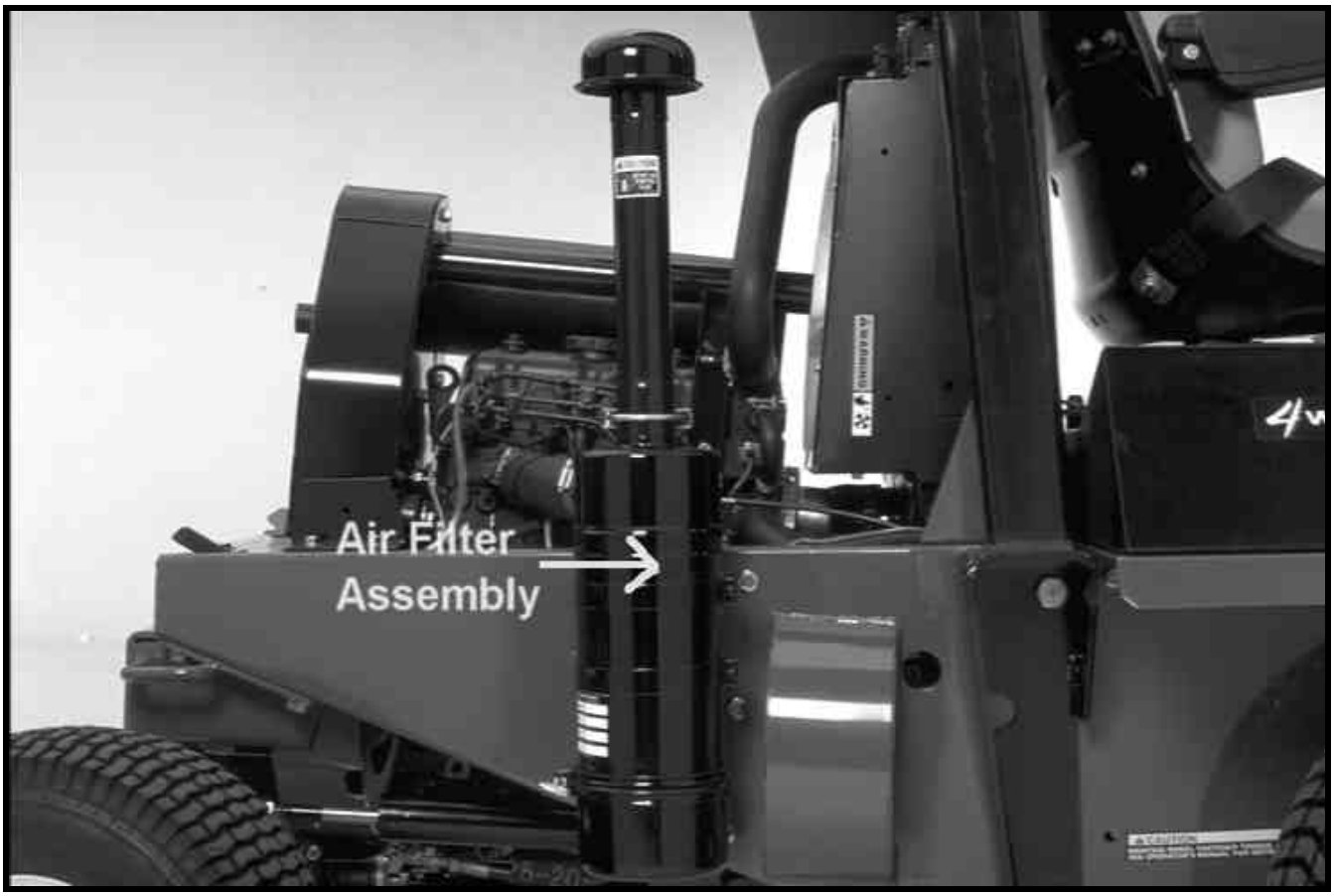
1. Ford 4 cylinder gas engine (45hp).
2. Sunstrand series M15 inline variable speed hydrostatic drive.
3. Hydraulic power steering.
4. Available in 2wd.

Options

1. Speed control.
2. 2-Post Roll-Over Protective Structure (ROPS).
3. 4-Post ROPS with sun roof.
4. Cab with ROPS.

Attachments

1. 72” Side discharge mower deck.
2. 72” Rear discharge mower deck.
3. 72” Guardian® Recycler® deck.
4. 88” Triflex® mower deck.
5. 48” Snowblower.
6. Debris blower.
7. Aerator.
8. Plug pulverizer.
9. Aero-seeder.
10. V-Plow.


Air Filter
Assembly

Air induction System

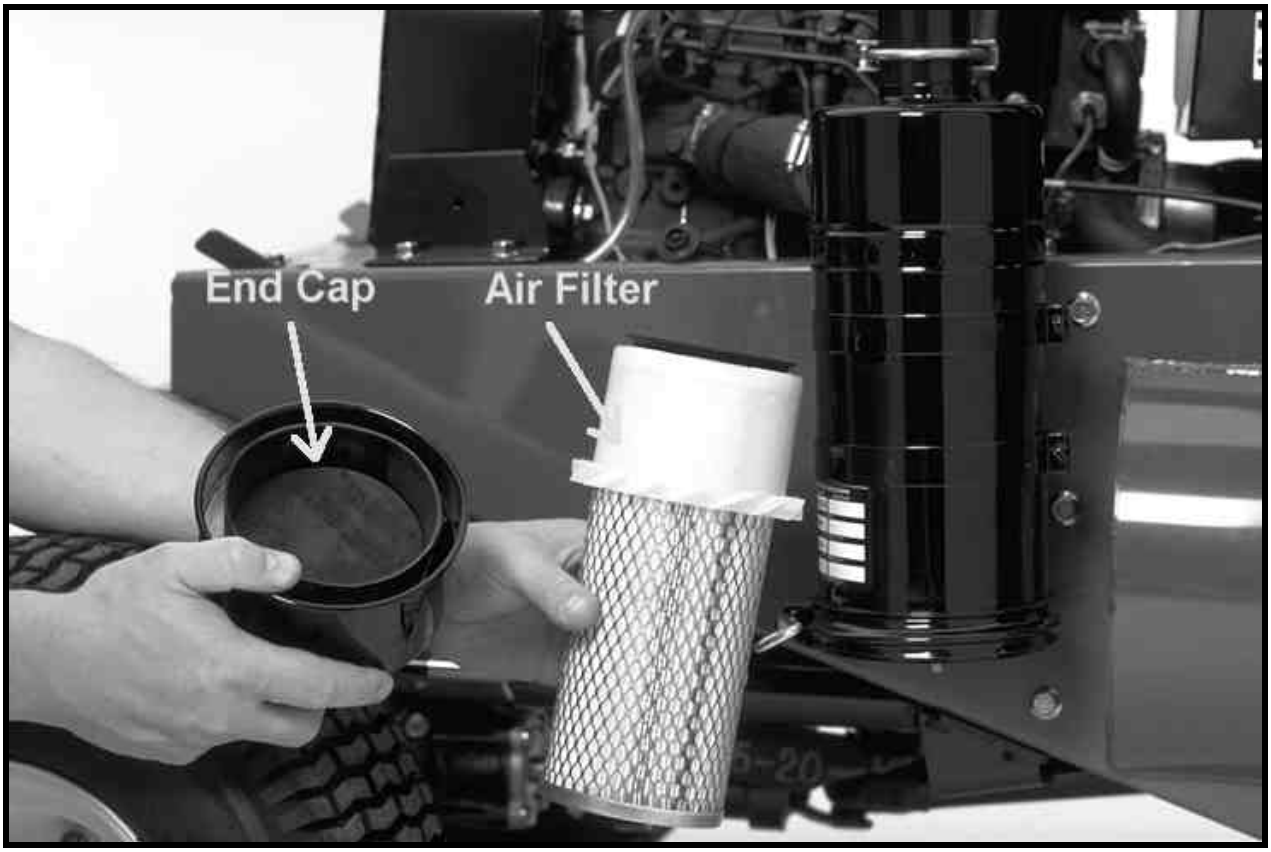
Service Recommendations.

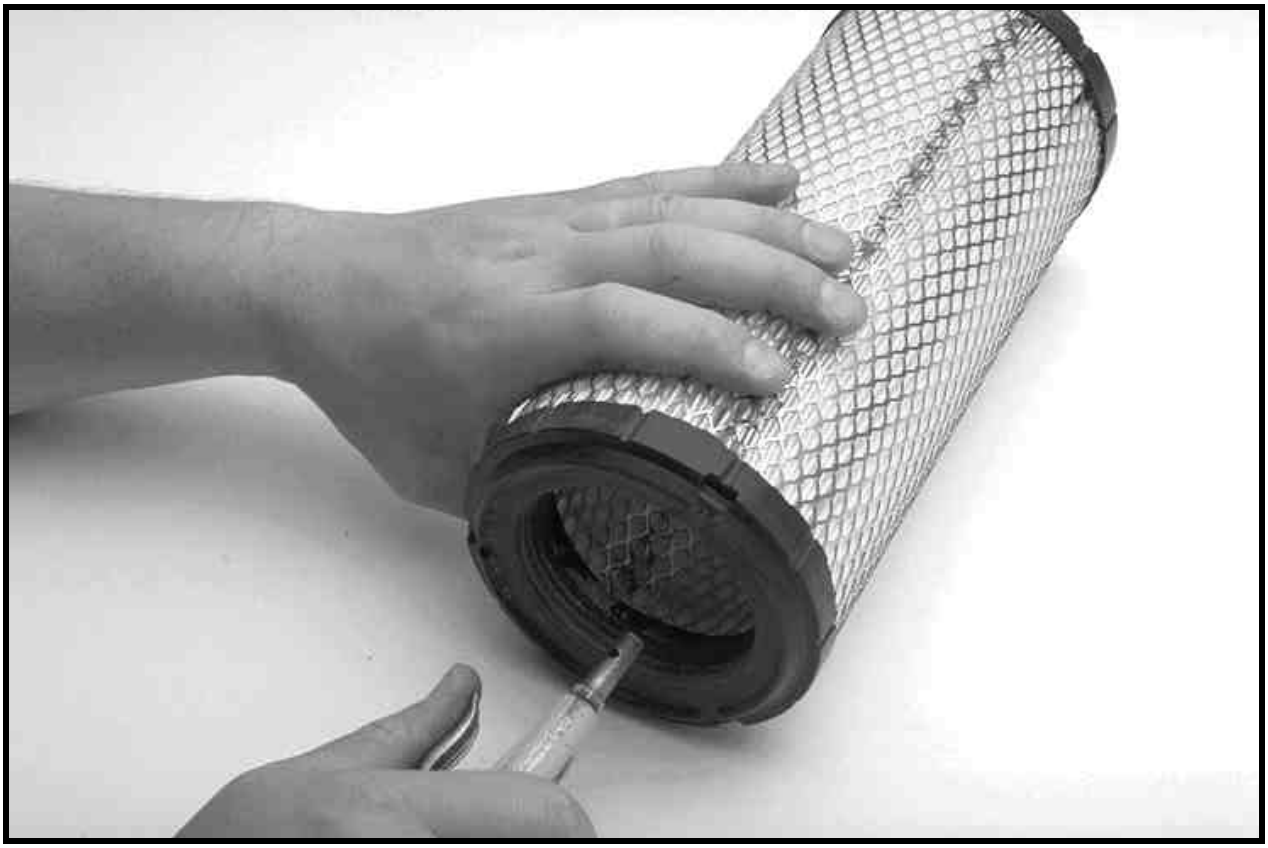
The air filter should be checked every 50 hrs of operation. More frequently in dusty or dirty conditions.

Symptoms of Faulty Air Filter:

1. Low Power :
   - Inadequate Air Supply. (Plugged filter).
2. Excessive Black Smoke:
   - Rich Fuel Mixture. (Plugged filter).
3. Excessive Oil Consumption: (Blue Smoke).
   - Plugged filter. (Pulling oil past the rings).
   - Dirt ingested in to the engine. (Filter not sealing, Dusted Engine).
4. Hard Starting:
   - Low compression, (Filter not sealing, Dusted Engine).

NOTES


End Cap
Air Filter



Filter Service

1. Inspect The Filter Element for:
   - Dirt.
   - Damaged element, (cuts, tears or holes).
   - Plastic fins, (broken or missing fins).
2. Inspect The Filter Seal for:
   - Cuts or tears.
   - Deterioration of the seal.
   - Placement of seal.
   - Proper contact.
3. Inspect the Filter Housing End Cap:
   - Cap (damaged or bent).
   - Dirt accumulation in cap.
   - Rubber insert.

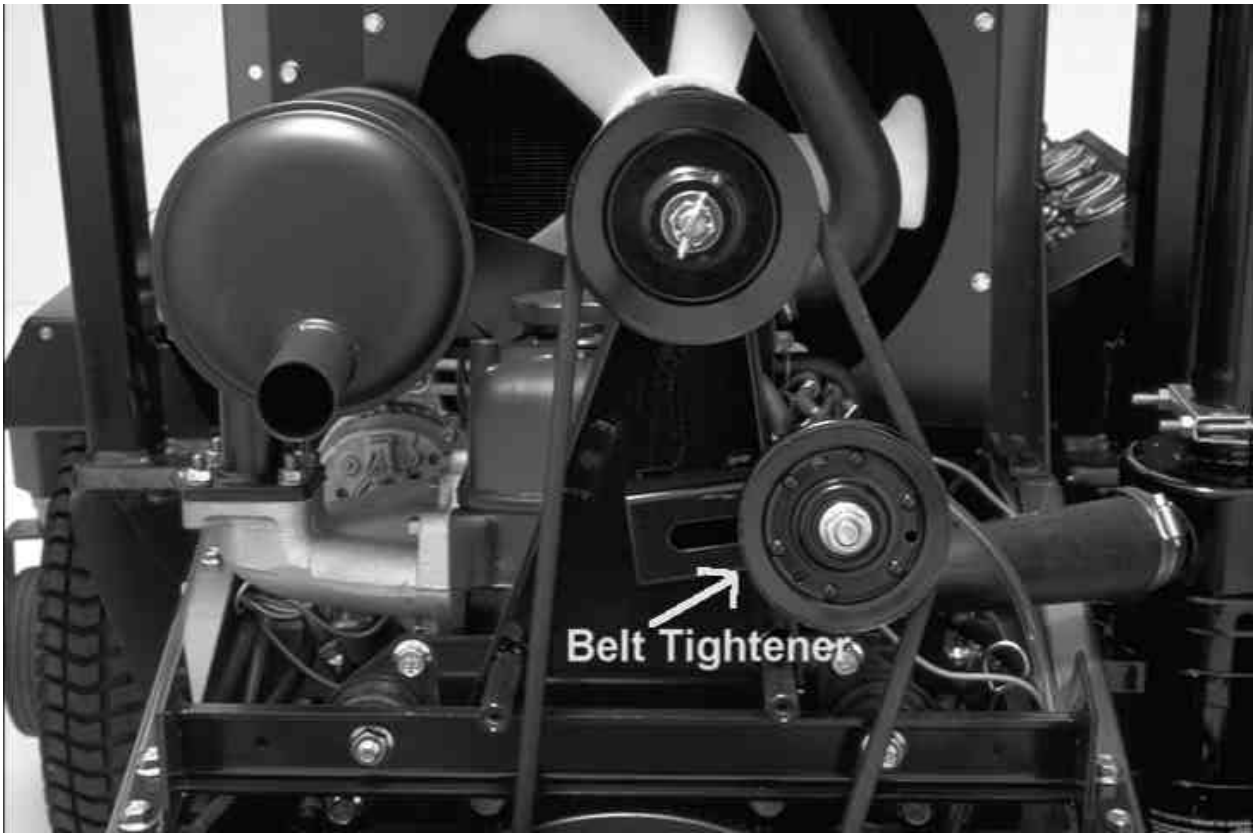
Clean dirty air filters with low-pressure (100-PSI) air. After cleaning the filter inspect it with a light, if any damage is visible, replace the filter element with a new one.

Intake Hoses and Manifold

1. Inspect hoses and manifolds for signs of dirt, indicating a faulty air filter or leaking hoses.
2. Check hose clamps and gaskets.

NOTES

Radiator
WARNING


Belt Tightener

Service Recommendations.

Inspect the cooling system hoses every 100 hrs.
The cooling system is filled with a 50/50 mixture of ethylene glycol anti-freeze.

Symptoms of cooling system problems:

1. Engine overheating:
   - Low coolant level.
   - Plugged radiator fins or internal cores.
   - Waterpump or fan slipping (belt loose or bad).
2. Coolant leakage:
   - Damaged or faulty hoses.
   - Leaking hose clamps.
   - Leaking radiator.
3. Engine damage:
   - Low freeze protection (Block cracked by freezing).
   - Internal components damaged by corrosion. (Low anti-corrosion protection of the Anti-freeze).

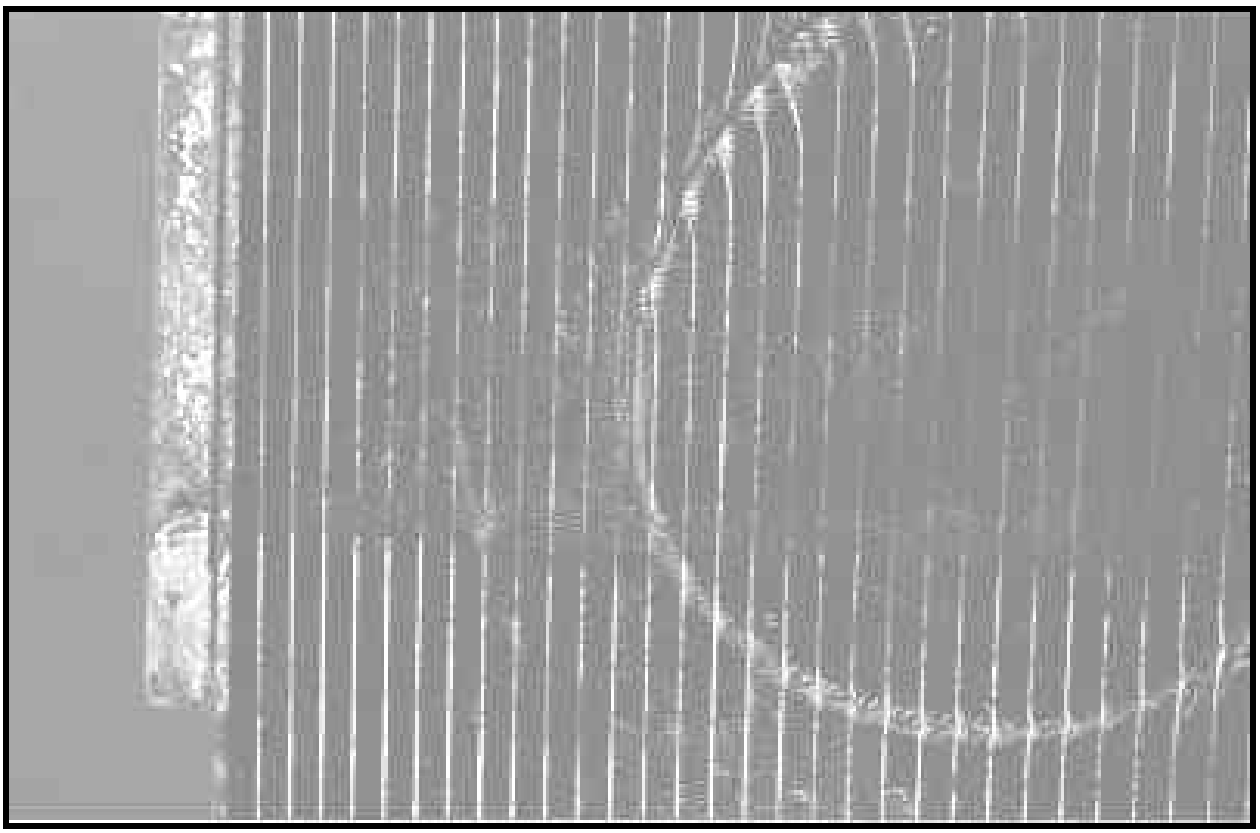
Belt Maintenance:

Check the fan belt tension after the first day of operation, and then check the condition and tension of the belts after every 100 hours of use.

1. Adjust the belt so the belt deflects 1/4-in. midway between the pulleys, when 5 lbs. of force is applied.
2. Check the condition of the belt pulleys and tighteners.

NOTE: A loose fan belt can cause the engine to overheat.

NOTES

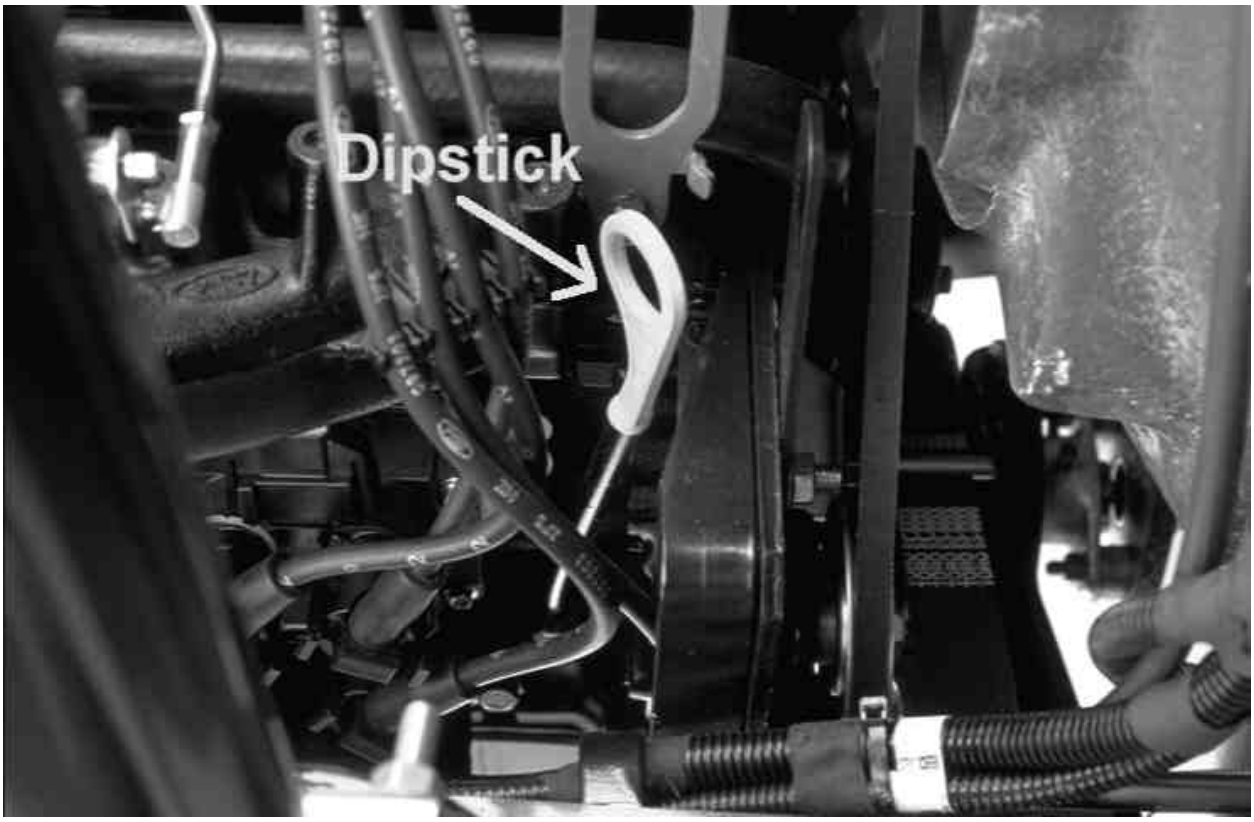


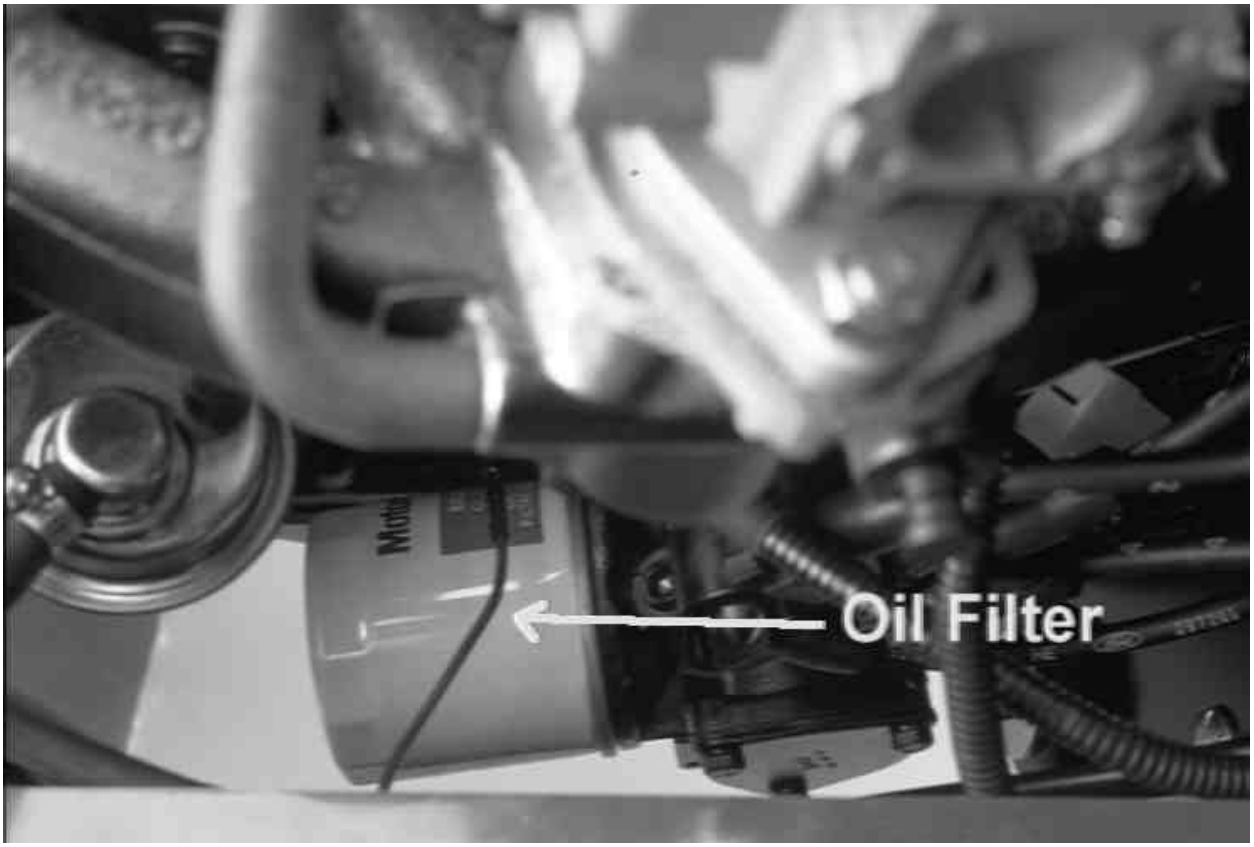
Cooling System inspection

1. Inspect hoses for:
   - Cracks or deterioration from heat.
   - Wear or scuffing from incorrect hose routing.
2. Inspect radiator for:
   - External dirt and debris.
   - Coolant leaks.
   - Internal plugging. Caused by weak or neglected anti-freeze.
   - Fin damage.
   - Broken supports or fan shroud.
3. Inspect coolant for:
   - Fluid level.
   - Strength (freeze protection).
   - Contamination (engine oil).
   - Condition (dirty or rusty looking).

Radiator Cleaning:
Use compressed air, **Do not use water.** Water does not remove all the dirt and washes some of the dirt to the lower portion of the radiator where it collects and hardens. Water can also react with some turf chemicals and damage the radiator.

NOTES


Dipstick


Oil Filter

Engine Lubrication

Service Recommendations:

The engine oil level should be checked daily. Be careful not to over fill the engine.

1. When checking the oil level, check the condition of the oil.
   - Check for milky looking oil (water contamination).
   - Check for fuel smell (fuel contamination).

Change engine oil and filter after the first 50 hrs. Then every 100 hrs. thereafter.

Engine Oil Recommendations (Gas Engines):
The gas engine uses a high quality detergent oil having the American Petroleum Institute -API- "service classification" SG. Oil viscosity -weight- must be selected according to the ambient temperature.

Single Viscosity Oils:

Outside Temperature.	
-10°F(-23°C) to +60°F(15°C)	SAE 10W
+10°F(-12°C) to +90°F(32°C)	SAE 20W-20
Above +32°F(0°C)	SAE 30
Above +50°F(10°C)	SAE 40

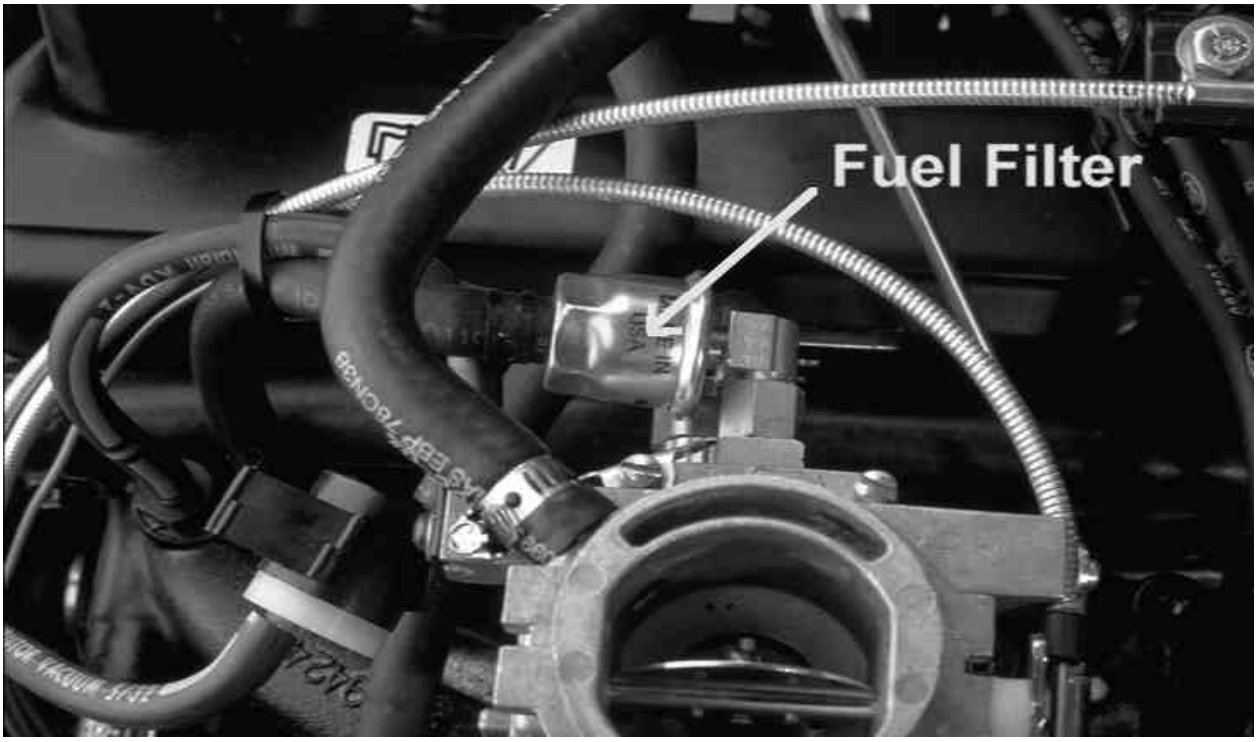
Multi-Viscosity Oils:

Outside Temperature.	
Below +60°F(15°C)	SAE 5W-30
-10°F(-23°C) to +90°F(32°C)	SAE 10W-30
Above -10°F(-23°C)	SAE 10W-40 or 10W50
Above +10°F(-12°C)	SAE 20W-40 or 20W50

Engine Oil Recommendations (Diesel Engines):
The diesel engine uses a high quality detergent oil having the American Petroleum Institute -API- "service classification" SF/CC or CD. Recommended oil viscosity: SAE 10W-30.

NOTES

Fuel Line


Fuel Filter

Fuel Systems (Gas & Diesel)

Symptoms of fuel system problems:

1. Frequent plugging of fuel filters.
   - Contamination in main unit fuel tank.
     Drain fuel tank.
     Flush with approximately 2 gal. clean fuel.
2. Low power, poor engine performance, stalls under heavy load.
   - Plugged fuel filters (Change filters).
   - Plugged fuel tank vent (clean vent).
   - Contamination in the fuel tank plugging fuel line (flush fuel tank).

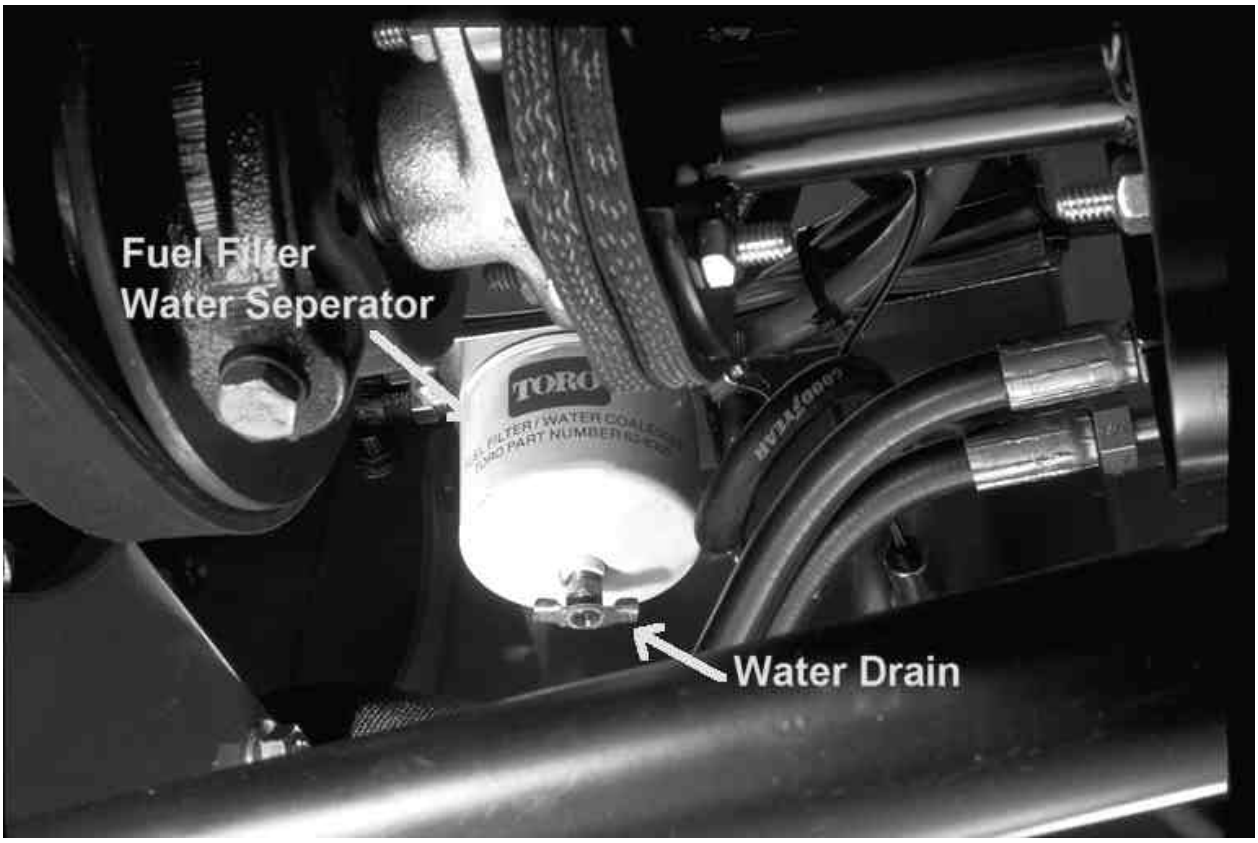
Service Recommendations:

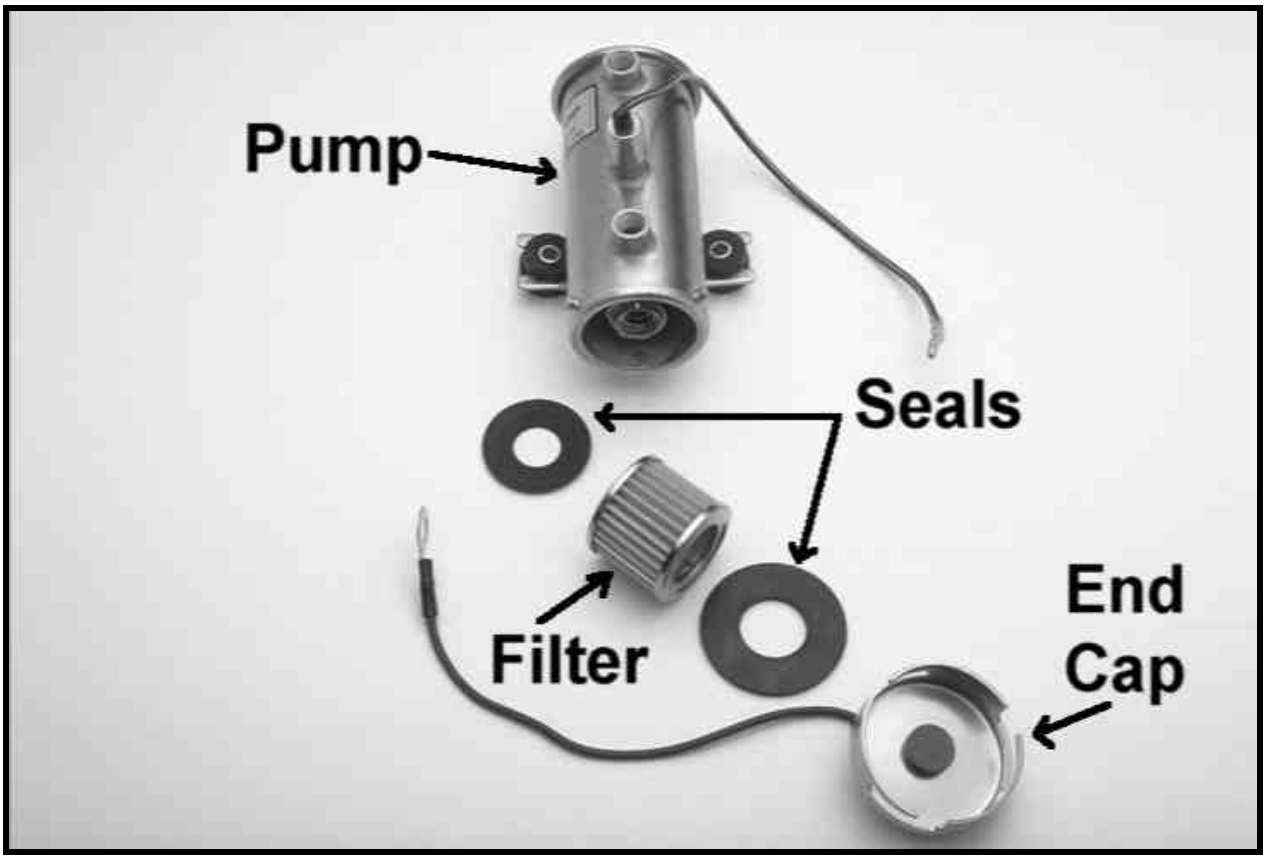
1. Drain and flush fuel tank every 1500 hrs.(both Gas and Diesel).
   - Drained by removing fuel supply line from the bottom of fuel tank.
   - Inspect condition of fuel line.

2. Replace fuel filter every 400 hrs. (Gas).
   - Inspect fuel line to carburetor.

Caution: Do not spill gasoline on a hot engine, wait till the unit cools before changing the filter. Wipe up spilled fuel.

NOTES

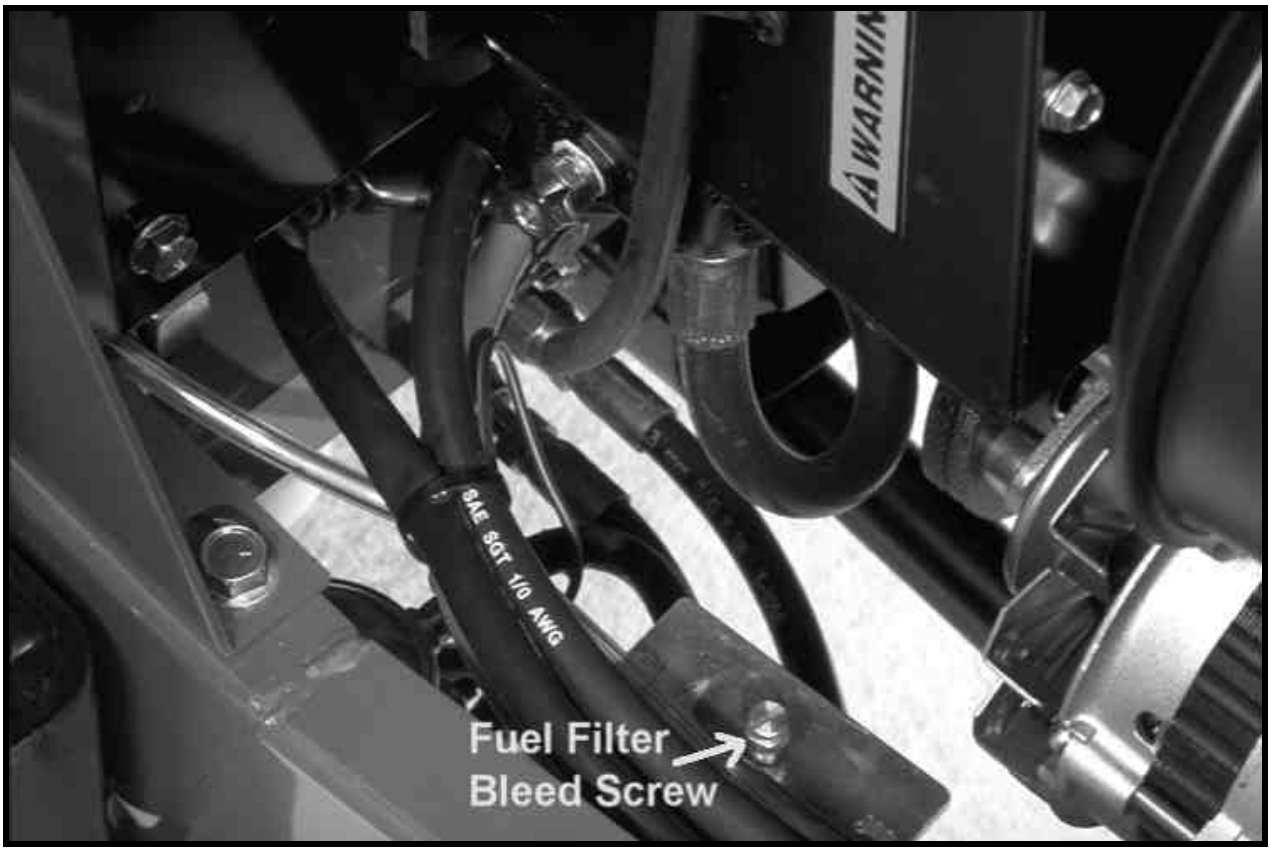

Fuel Filter
Water Seperator
TORO
Water Drain

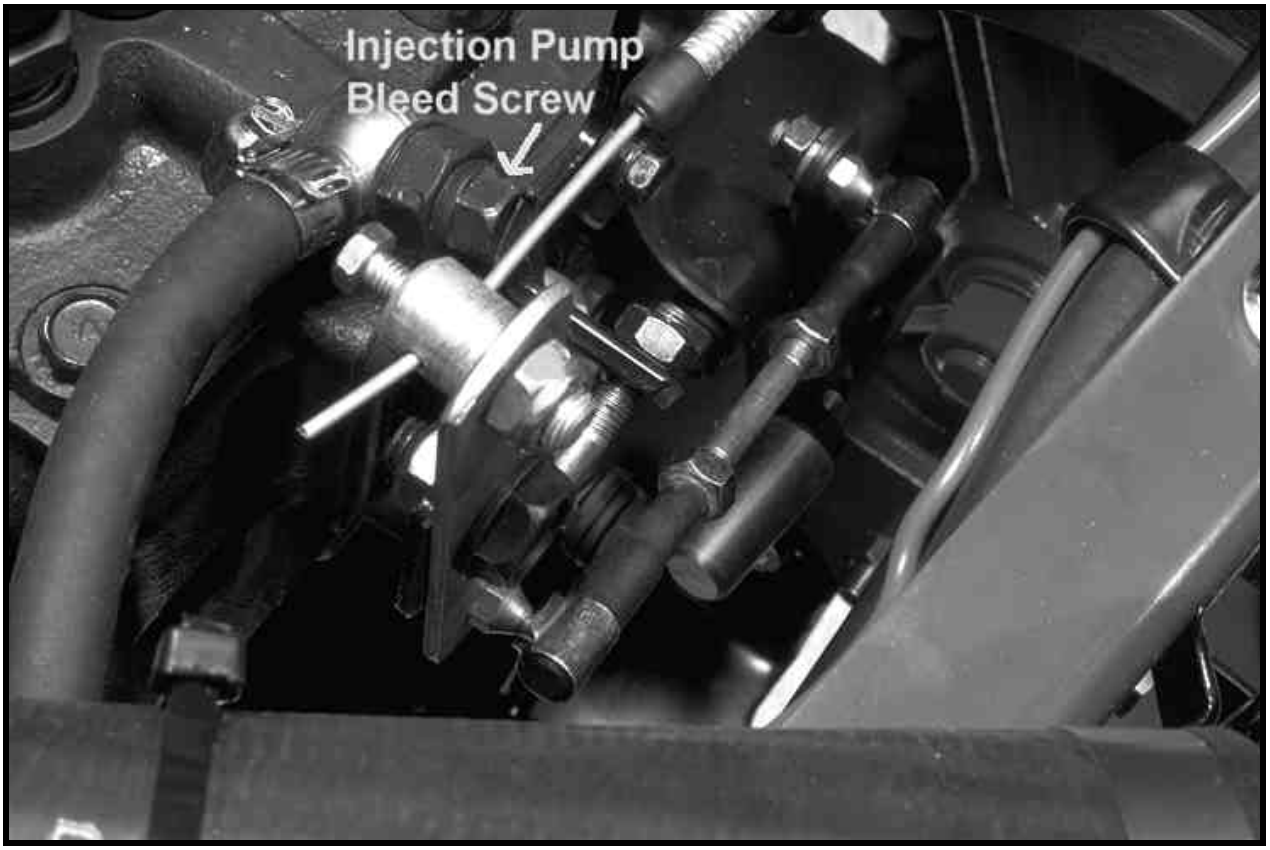

Pump
Seals
Filter
End
Cap

3. Drain the fuel filter/water separator daily.
   - Replace fuel filter/water separator every 400 hrs (Diesel).

4. Check fuel pump filter every 400 hrs (Diesel).
   - Inspect and clean the filter.
   - Replace fuel filter if damaged.
   - Inspect the two rubber gaskets. (PN. 43-2570 & 43-2560)

NOTES


WARNIN
SAE SGT 1/0 AWG
Fuel Filter
Bleed Screw


Injection Pump
Bleed Screw

Indications of air in the injection system:

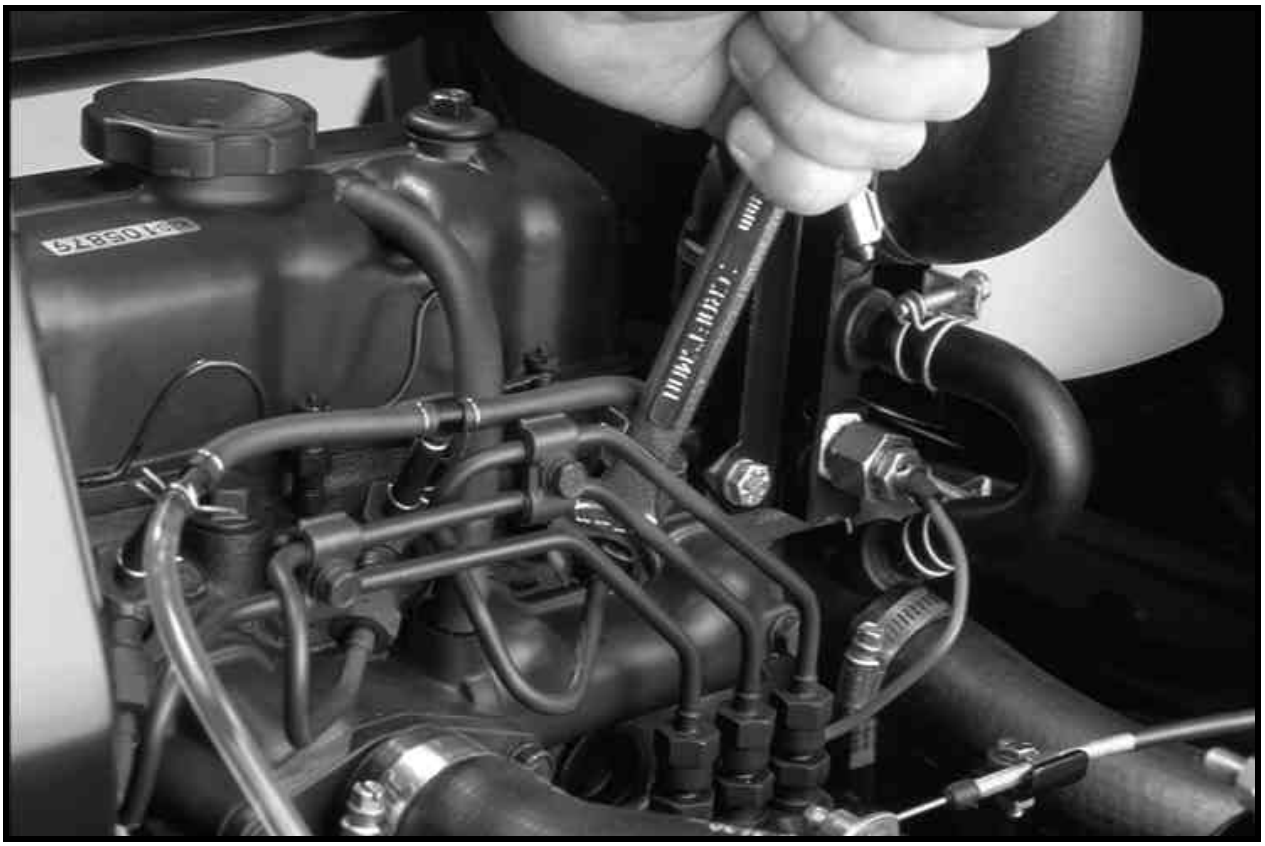
1. The engine may not start.
   - Air in the injection pump.
2. The engine may start then stall.
   - Air in fuel filter gets in the fuel injection pump and the engine stalls.
3. The engine may start and run rough.
   - Air trapped in one or more injection line. Engine not running on all cylinders.

Bleeding Fuel System (Diesel Engine):

After servicing the fuel system on the diesel engine, the air must be bled from the system.

1. Bleed air from the fuel filter/water separator.
   - Removes air from the line between the fuel tank and the fuel filter. And from the fuel filter.
2. Bleed air from the injection pump.
   - Removes air from the fuel line between the filter and the injection pump.

NOTES



Clean Out
Port

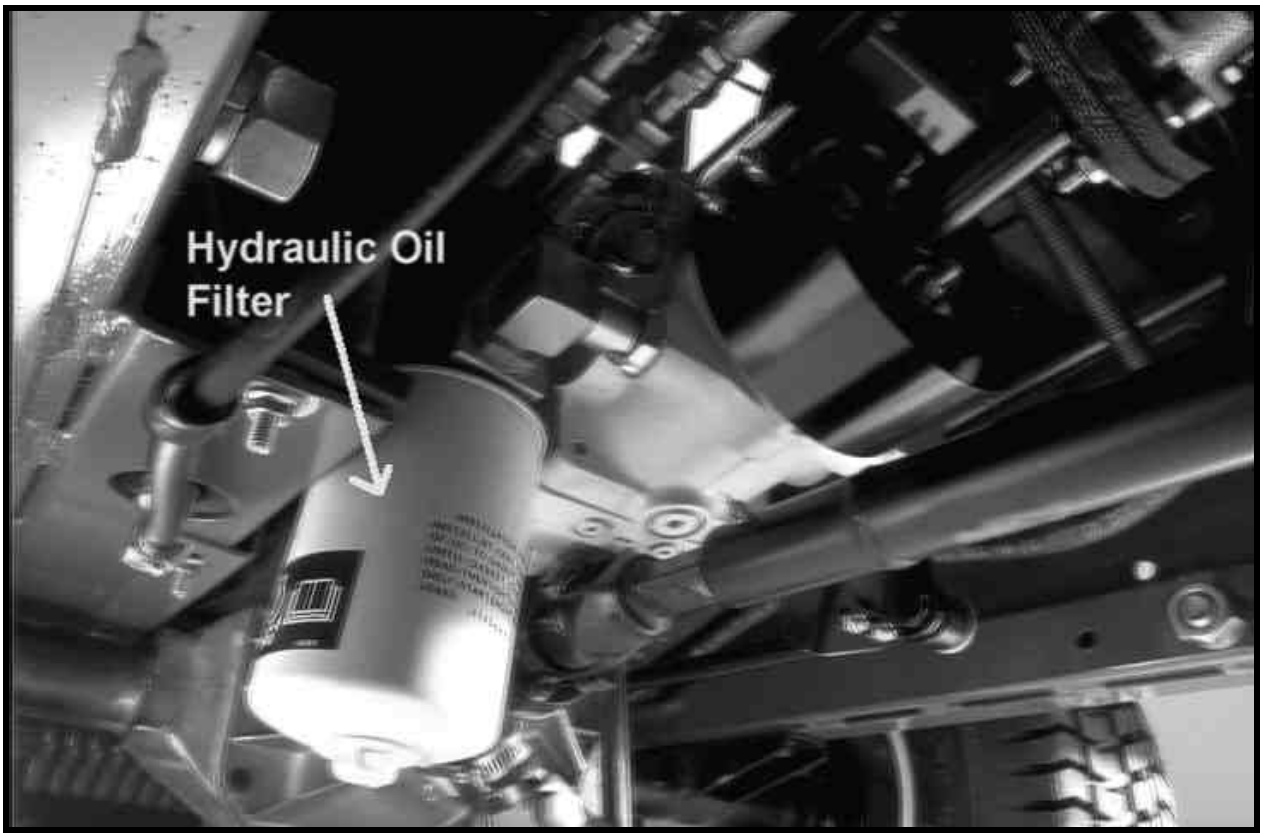
3. Bleed air from the injection lines.
   - Removes air from the injection pump and the nozzle lines.
   - Not necessary to bleed lines often.

Servicing The Spark Arrestor Muffler, (Gas Unit).

Every 200 hours of operation, clean the muffler of carbon buildup.

NOTES

Oil Level
"Full Mark"


Hydraulic Oil
Filter

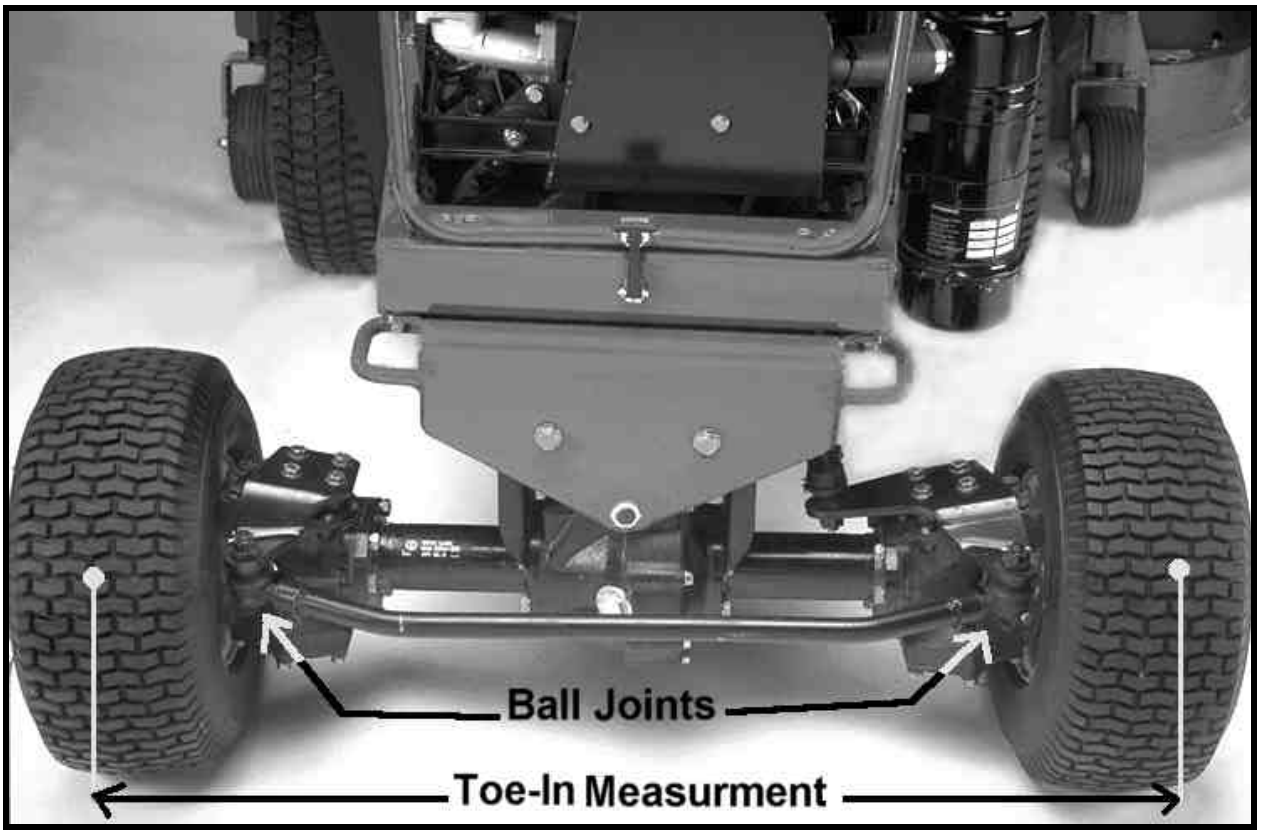
Service Recommendations

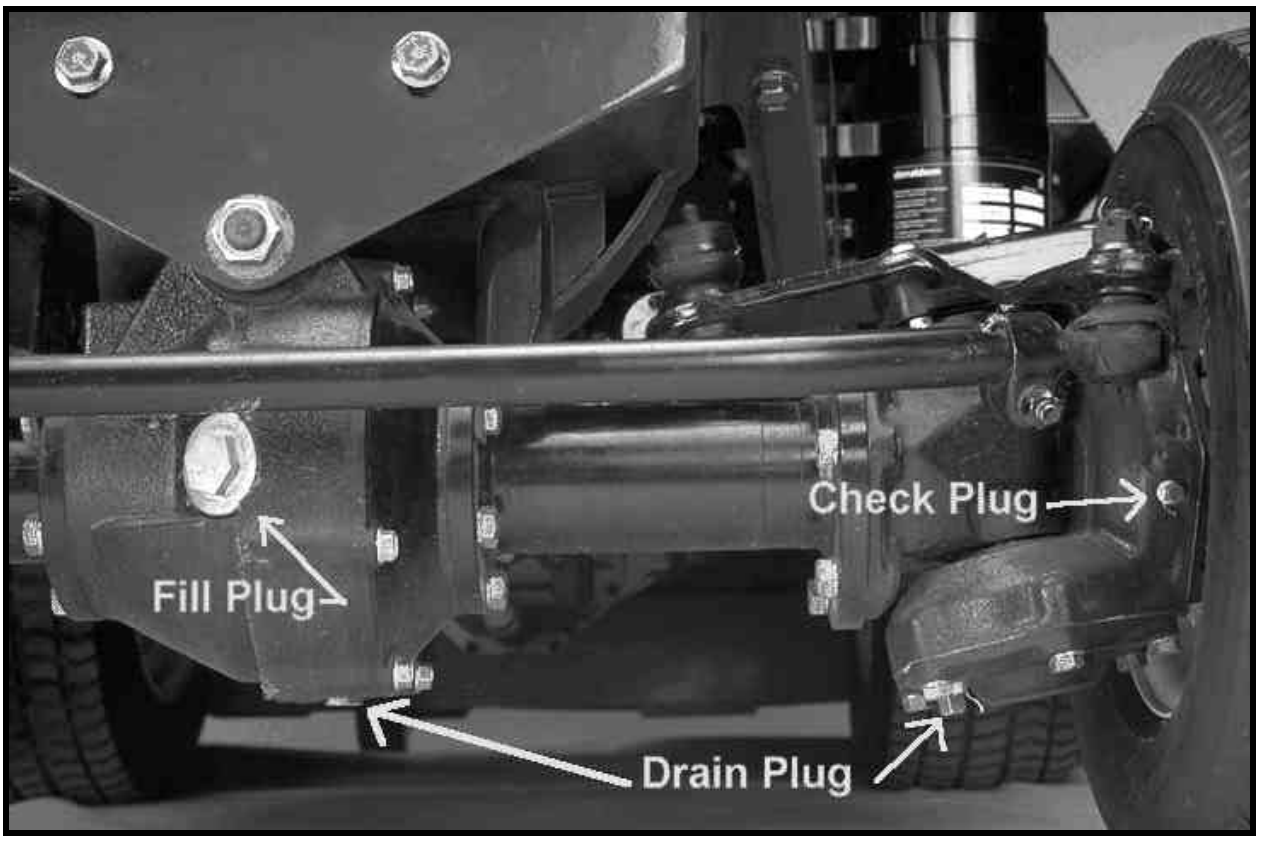
1. Hydraulic oil level should be checked daily.
   - Check the condition of the oil on the dipstick.
     - Milky or cloudy oil indicates water contamination.
     - Dark or black oil indicates dirt contamination or excessive operating temperature.
2. Hydraulic filter should be changed after the first 10 hrs then every 200 hrs after that.
   - The hydraulic filter on the machine when shipped, is printed with a red label.
   - The replacement filter through service parts is printed with a black label.
   - **A new filter for the 10-hr change is shipped with the machine.**
3. The filter can be cut open to check for hydraulic system problems.
   - Brass indicates a hydrostatic rotating group failure.
   - Steel indicates a charge pump or bearing failure.
4. The hydraulic oil should be changed every 400 hrs of operation.
5. Recommended oil:
   - The unit oil capacity is about 5 Quarts of SAE 10w30 engine oil.

Hydraulic/Hydrostatic system problems.

1. Slow hydraulic system response.
   - Low hydraulic oil level.
   - Plugged hydraulic filter.
   - Misadjusted hydraulic control linkage.
   - Faulty implement relief valve.
   - Hydrostatic pump or motor problem.
2. Noisy hydraulic system operation.
   - Low hydraulic oil level.
   - Plugged hydraulic oil filter.
   - Air leak in suction circuit.
   - Sticking hydraulic valves.
3. Excessive oil temperature.
   - Plugged hydraulic oil filter (low oil flow to cooler).
   - Cutting unit too heavy or relief valve weak.
   - (Oil flowing through relief valve).
   - Sticking valves in hydrostatic system.
   - Plugged or dirty oil cooler.
   - Plugged or dirty radiator (restricting airflow to the oil cooler).

NOTES


Ball Joints
Toe-In Measurment


Check Plug
Fill Plug
Drain Plug

Adjusting “Toe-In” 2WD / 4WD axles and steering linkage

Service Recommendations:

Check rear wheel “toe-in” adjustment and steering linkage every 200 hrs.

Indications of rear steering problem:

1. Unit wanders (doesn’t go in a straight line).
   - Loose or worn steering tie rod ends.
   - Incorrect rear wheel “toe-in” adjustment.

Adjusting “toe-in”:

1. With the wheels straight ahead measure the front and back of the wheel at axle height.
2. Correct “toe-in” should be 0 - 1/8 inch.

Steering Stop adjustment, (4WD axle):

1. The rear axle steering stops prevents over travel of the steering cylinder in case of an impact on the rear wheel.
2. Adjust the bolt for 0.090 inch clearance.

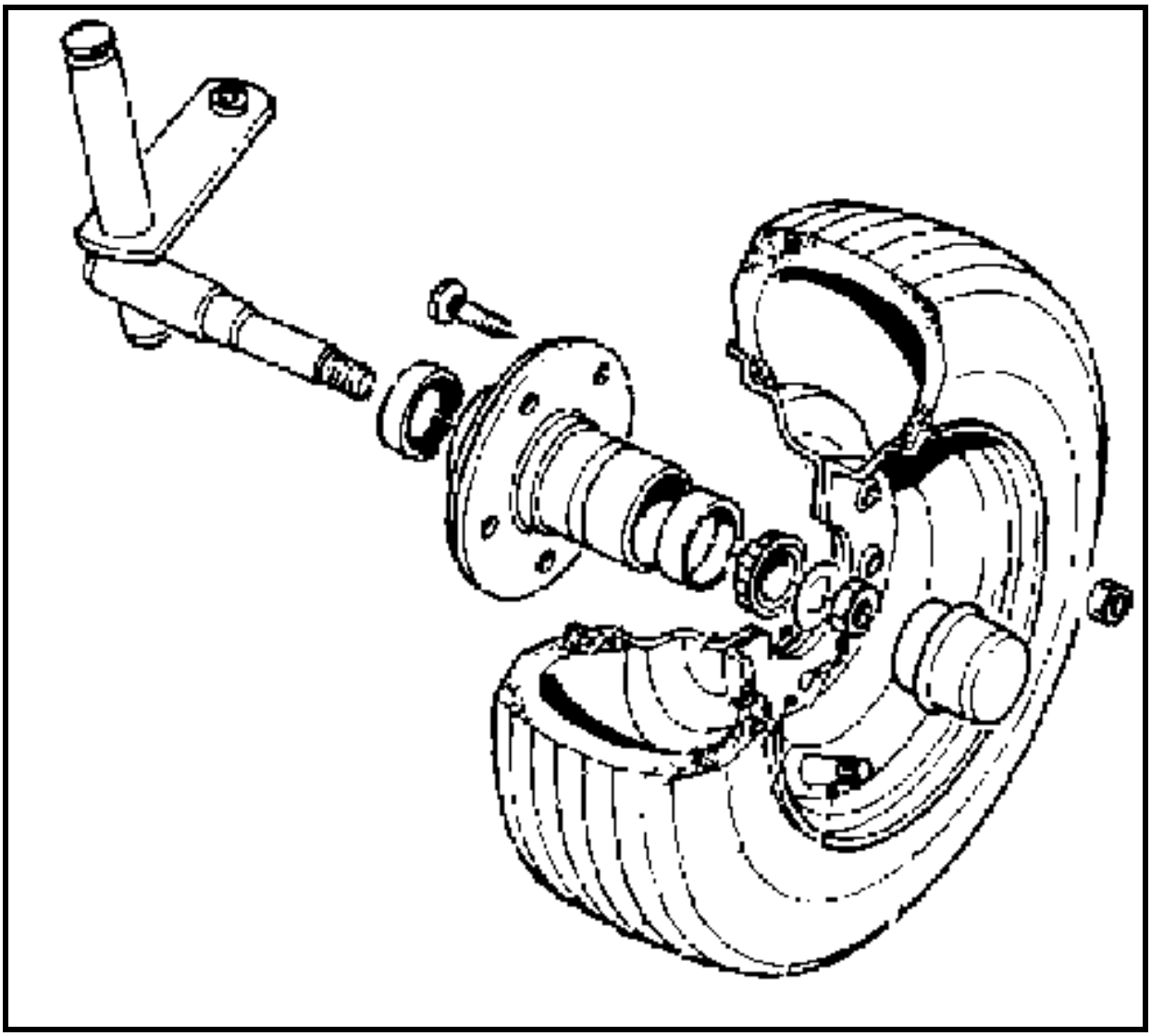
4WD axle Maintenance:

Service Recommendations:

Change rear axle oil every 400 hrs of operation.

1. Drain the oil and refill with 80w-90 wt gear lube.
2. Refill till the oil is to the bottom of the two check plugs and the fill hole.

NOTES



Service Recommendations:

Disassemble, clean and repack the rear wheel bearings every 400 Hrs of operation.

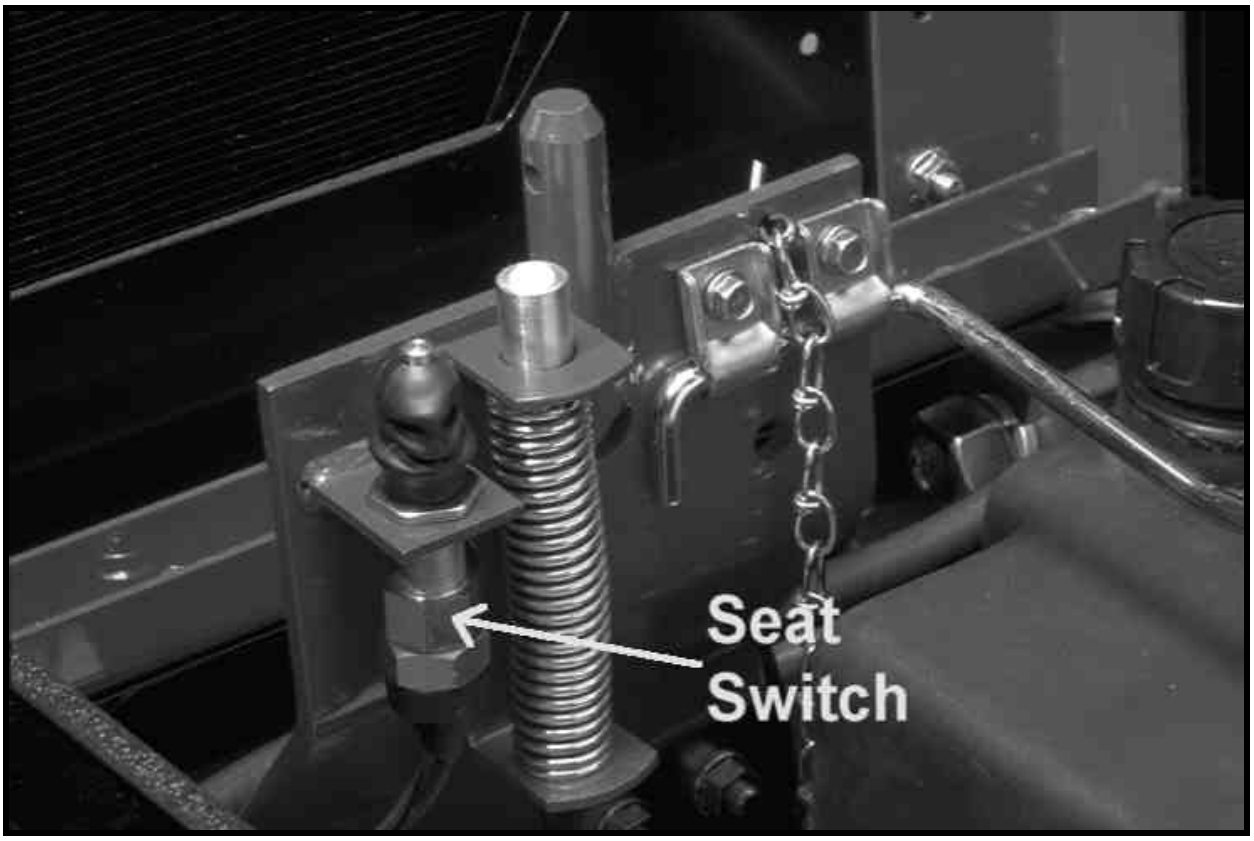
1. Remove wheel bearings and inspect.
2. Repack bearings with No.2 general-purpose grease.
3. Reassemble bearings and adjust preload.
   - Rotate the wheel and tighten the nut until a slight drag is felt. Then loosen the nut until the cotter pin will fit in the nearest slot.
   - NOTE: The correct end play is .002-.005

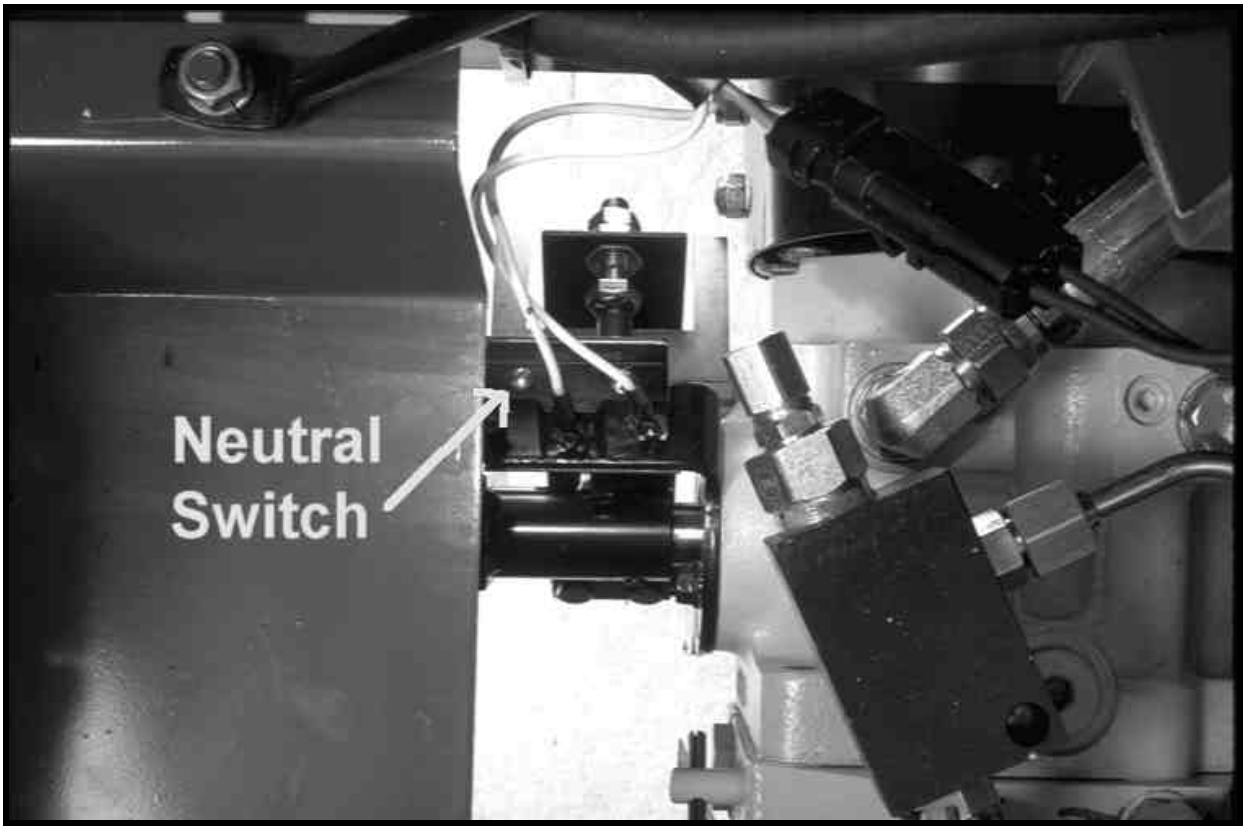
Indications of wheel bearing failure:

1. Noise from rear wheels.
   - Excessive end play.
   - Bearings dry (rollers noisy).
   - Bearing rollers or race failed.
   - Bearing cage failed (rollers climbing each other).
2. Rear wheel won't turn.
   - Bearings tightened too tight (no endplay).
   - Lack of lubrication, (rollers seized to the race).
3. Grease leaking from seal.
   - A failed bearing can damage the seal and grease can be thrown out of the wheel hub.
4. Wheel came off.
   - Bearing retaining nut backed off. (Cotter pin sheared or missing).
   - Outer bearing failed allowing wheel to come off.

   NOTE: it is important that the bearing failure be corrected as soon as it is detected, damage to the wheel hub and spindle can occur if operated with a failed bearing.

NOTES


Seat
Switch


Neutral
Switch

The electrical system on the 300 Series Goundsmaster can be broken into the following circuits:

1. Starting/Charging.
2. Safety Interlock.
3. Gauges and warning.
4. Engine.

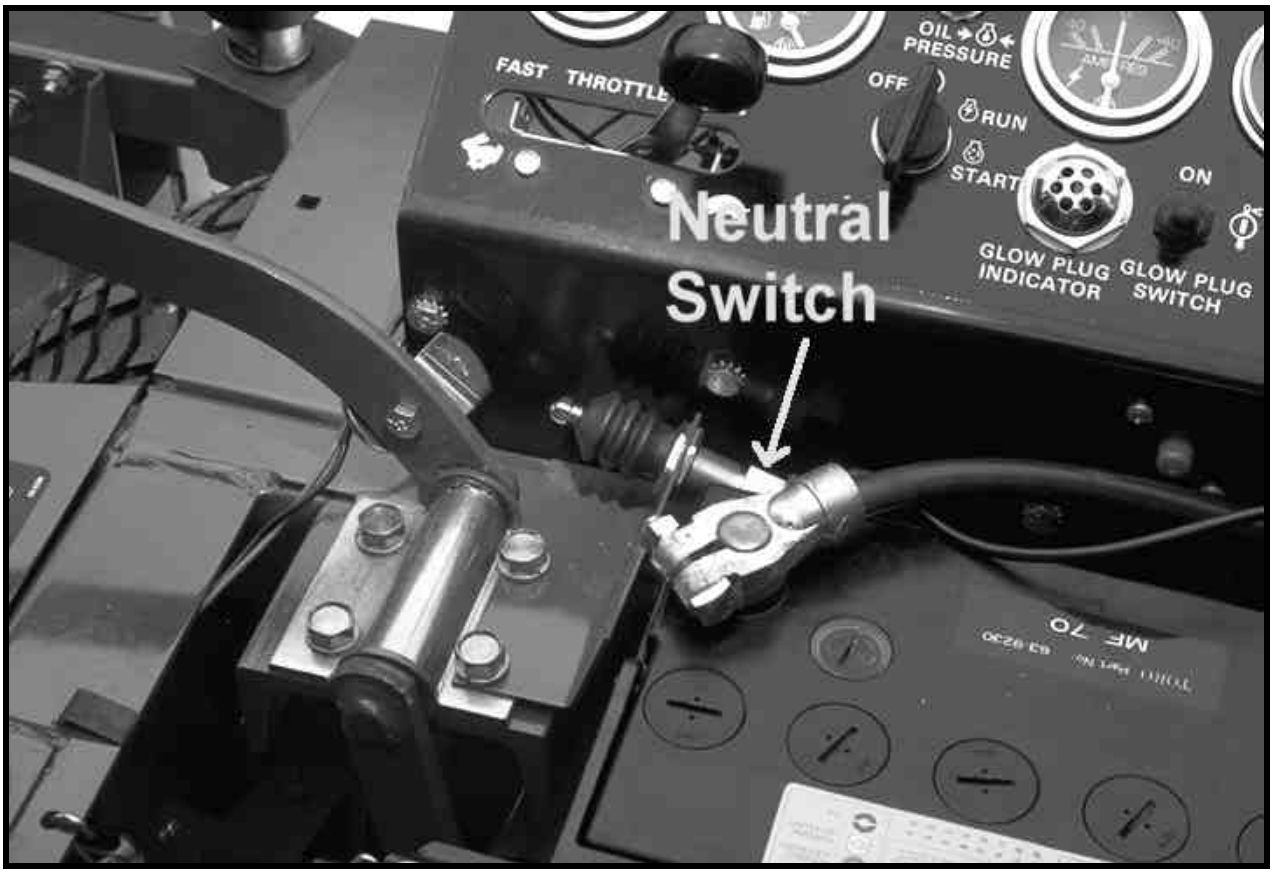
1. Starting and Charging Circuit:

- Battery.
  - Check the fluid level every 50 hrs.
- Cables.
  - Check battery connections every 50 hrs.
- Starter.
- Alternator.

2. Safety Interlock System:

- NOTE: replace all interlock switches every 1500 hours or two years.
- Seat Switch.
  - Closes when operator is in seat.
  - Unit will start without operator in seat if traction pedal is in neutral and PTO is disengaged.
- Neutral Switch.
  - Closes when traction pedal is in neutral.
  - Unit will shut off if traction pedal is moved out of neutral with out an operator in the seat.
- PTO Switch.
  - Closes when PTO is disengaged.
  - Unit should shut off if PTO is engaged with out an operator in the seat.

NOTES


FAST THROTTLE
OIL PRESSURE
OFF
RUN
START
ON
Neutral Switch
GLOW PLUG INDICATOR
GLOW PLUG SWITCH

Interlock Faults:

- Unit won't start, (operator in seat, traction pedal in neutral, PTO disengaged).
  - **Faulty or misadjusted PTO or Neutral switch.**
- Engine shuts off, (operator in seat, traction pedal moved forward or reverse).
  - **Faulty or misadjusted seat switch.**
- Engine shuts off, (operator in seat, PTO lever engaged).
  - **Faulty or misadjusted seat switch.**
- Engine stays running, (operator out of the seat, PTO engaged).
  - **Faulty or misadjusted seat switch or PTO switch.**
- Engine stays running, (operator out of the seat, traction pedal not in neutral).
  - **Faulty or misadjusted seat switch or Neutral switch.**

3. Gauges and Warnings:

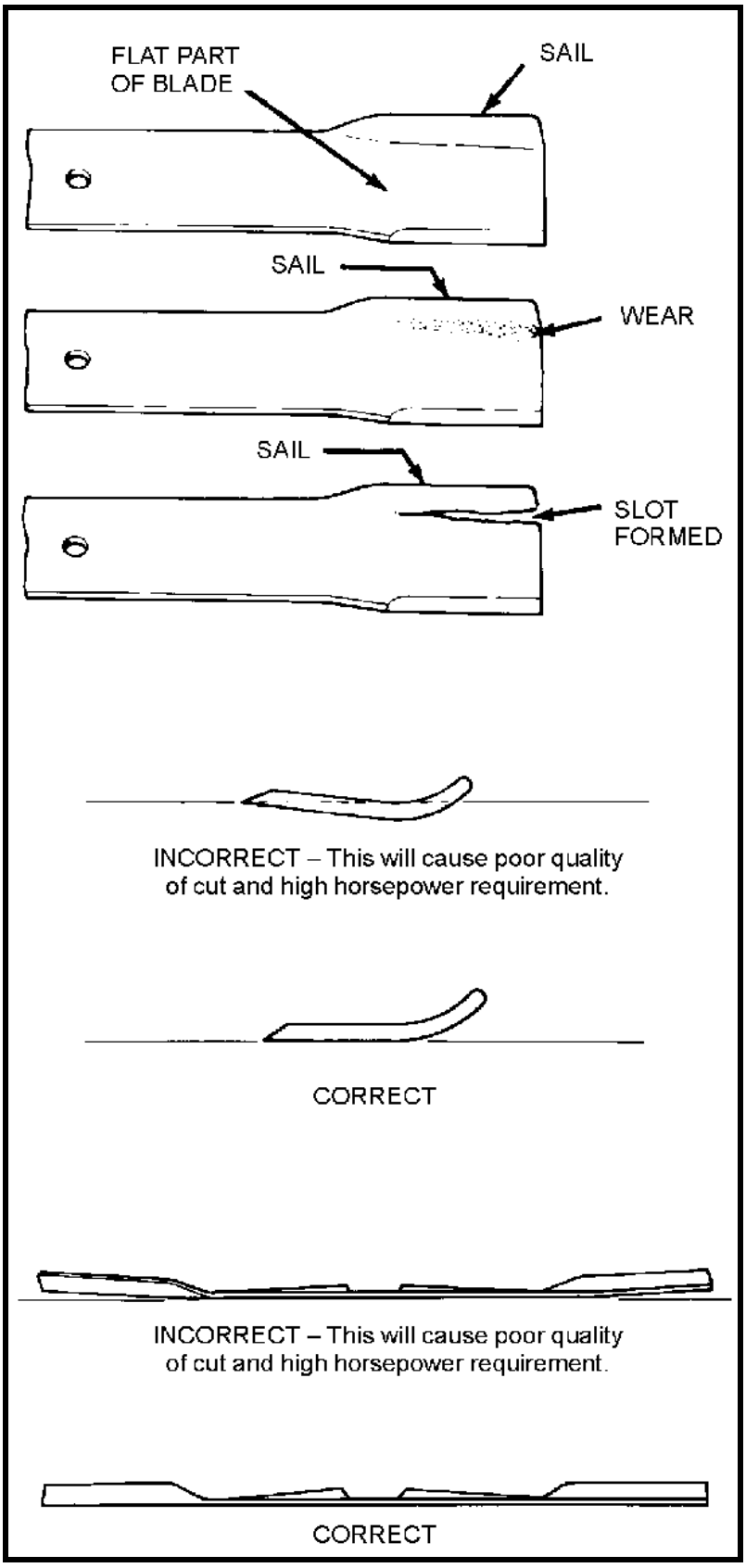
- Engine oil pressure light and buzzer.
- Ammeter.
- Fuel Gauge.

4. Engine Circuits:

- Ignition circuit.
- Carb solenoids.
- Glow plugs.
- ERT (Energize to run solenoid).

When servicing electrical components, protect the assembled connections with "Skin Over Grease" Toro PN 505-47.

NOTES


FLAT PART
OF BLADE
SAIL
SAIL
WEAR
SAIL
SLOT
FORMED
INCORRECT – This will cause poor quality
of cut and high horsepower requirement.
CORRECT
INCORRECT – This will cause poor quality
of cut and high horsepower requirement.
CORRECT

Service Recommendation:

1. Check mower blades daily.
2. Grease gauge wheel pivots daily.
3. Grease gauge wheel axle daily.
4. Torque blades every 50 hrs.
5. Grease spindle bearings every 50 hrs.
6. Check drive belt tension every 50 hrs.
7. Check gearbox oil every 50 hrs.
8. Change gearbox oil every 250 hrs.

Blade Servicing:

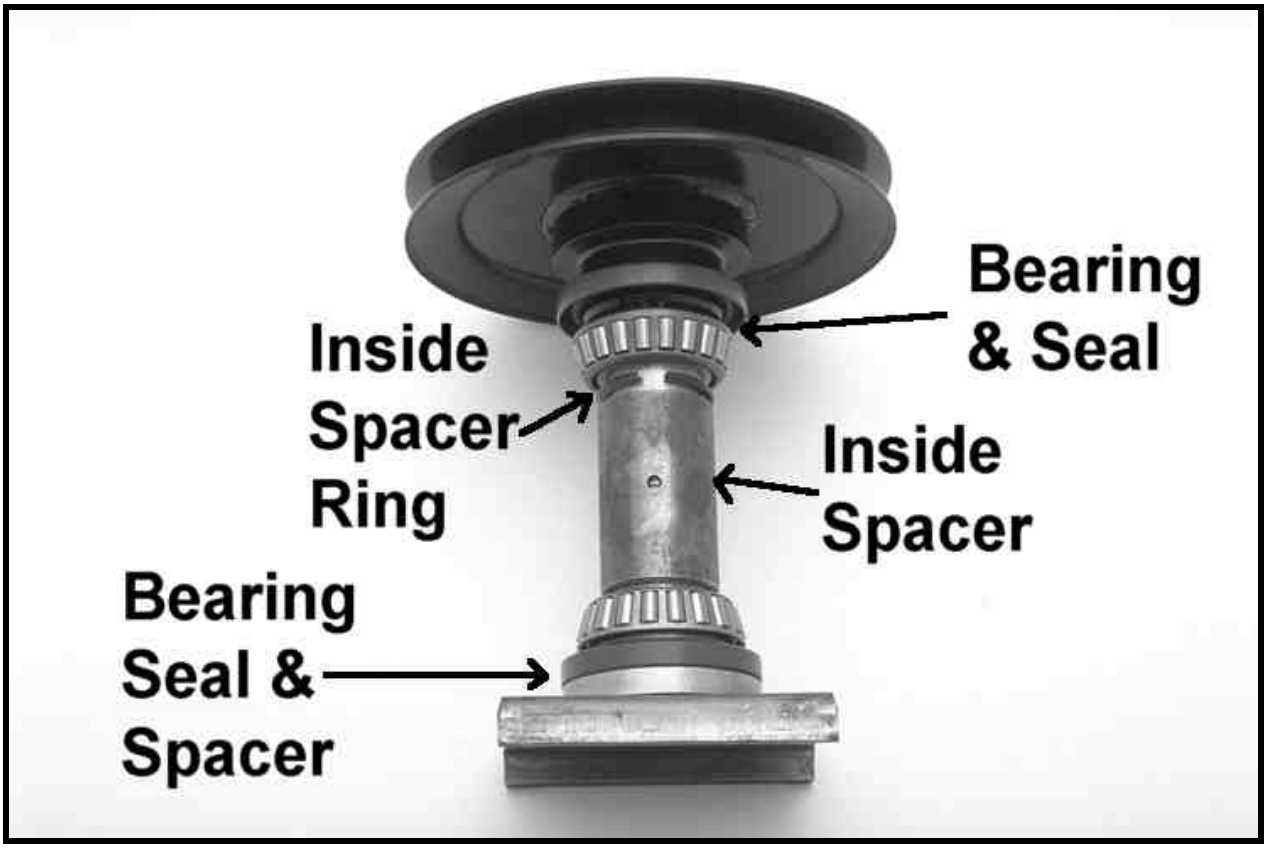
Check the blades for the following:

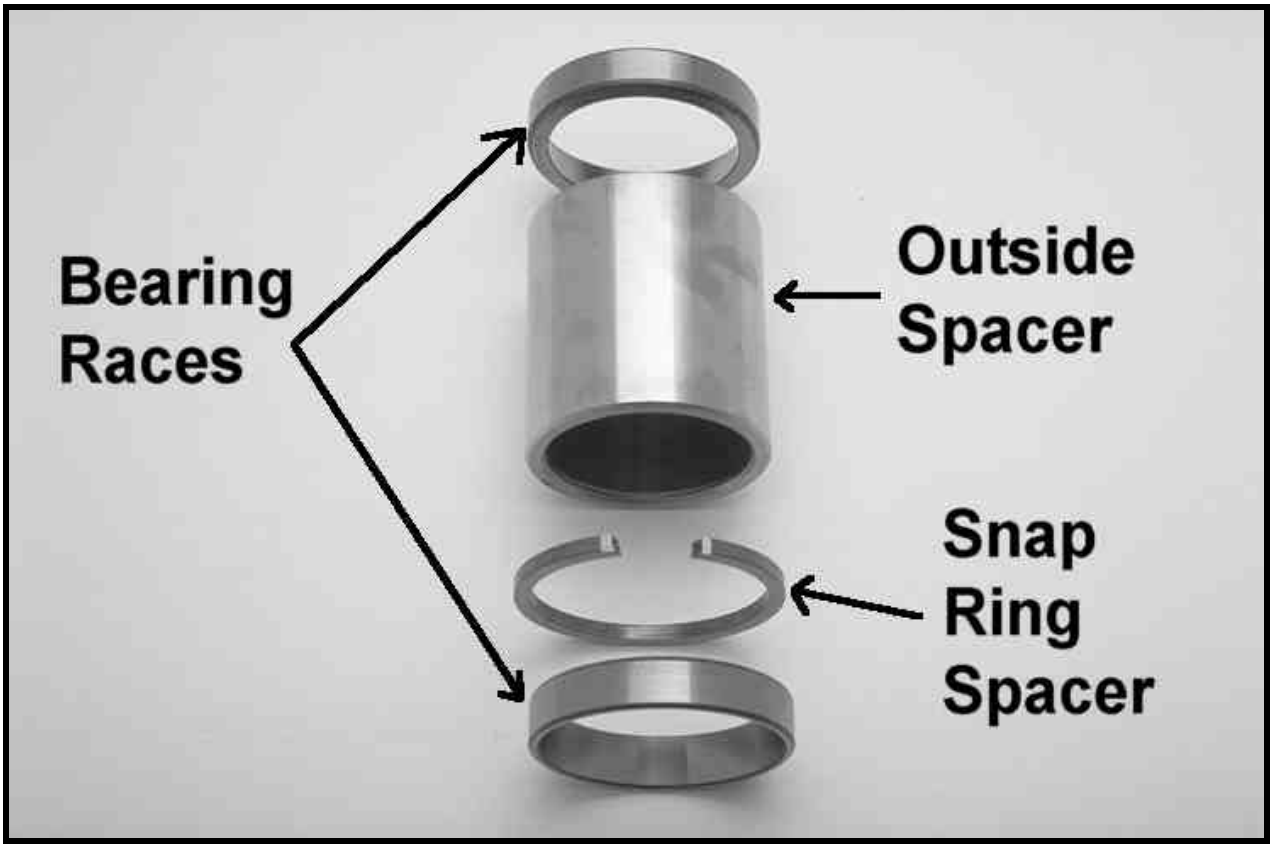
1. Wear in the sail area.
   - Wear can cause the sail to break loose from the blade and be thrown from the unit.
   - Replace blades with worn sail areas.
2. Twisted blades.
   - Check the blade from the end. Replace twisted blades.
3. Bent blades.
   - Check the blades for bent ends. Replace bent blades.

Quality of Cut Issues:.

1. High Horsepower requirements.
   - Blades dull (sharpen blades).
   - Blades twisted (replace blades).
   - Bent blades (replace blades).
   - Front of blade higher than rear of blade (adjust mower deck).
   - Mower spindle bearing out.
2. Poor cut quality (rough cut grass blades).
   - Blades dull (sharpen blades).
   - Blades twisted (replace blades).
   - Bent blades (replace blades).
   - Deck belts slipping (tighten belt).
3. Mis-match cut (stripes, uneven height).
   - End of blades worn, no overlap (replace blades).
   - Blade ends not aligned, blade bent (replace blade).
   - Blade ends not aligned, blade is straight (shim spindle housing).
   - Blade ends not aligned, blade is straight, spindle bearings loose (repair spindle bearings).
   - Mower deck not level (level mower deck).

NOTES


Bearing
& Seal
Inside
Spacer
Ring
Inside
Spacer
Bearing
Seal &
Spacer


Bearing
Races
Outside
Spacer
Snap
Ring
Spacer

Spindle Bearing Service

Indications of spindle bearing failure.

1. Noisy operation.
   - Spindle bearing loose, making noise.
2. Grease leaking from seals.
   - Bad bearings damages seals.
3. Belt failures.
   - Pulleys misaligned because of bad bearings.
4. High horsepower requirements.
   - Spindle bearings drag.
5. High bearing housing heat.
   - Bearings drag causing heat.

Cautions when rebuilding spindles.

1. Bearings and spacers are a match set.
   - Do not intermix new and old bearings and spacers when rebuilding spindles.
   - Install inside spacer and inside spacer ring on spindle shaft (No groove in shaft for inside spacer ring).
   - Install snap ring spacer in the groove cut in the bearing housing).
   - Install one race below snap ring.
   - install outside spacer and race above the snap ring.
2. Fill housing with grease when assembling.
   - Makes sure that the bearing have ample lubrication for initial operation. (Prevents low hour repeat failures).

Seal replacement.
When replacing the spindle seals be careful to install the seals with the seal lips facing in the correct direction.

72” Recycler Deck.
1. The upper seal lip faces inward toward the upper bearing.
2. The lower seal lip faces outward, away from the lower bearing.

72” Rear Discharge & Side Discharge.
1. The upper seal lip faces outward away from the upper bearing.
2. The lower seal lip faces outward, away from the lower bearing.

Check spindle rotation.
- Spindle should rotate smooth the full turn.
- Should be slight drag when rotated (seal drag).
- If spindle won’t turn, disassemble and check spacers for proper location.

NOTES

Maintenance Parts

325-D

1.	Air Filter.	27-7110
2.	Engine oil filter.	67-4330
3.	Fuel Pump Filter.	43-2550
4.	Fuel Filter.	63-8300
5.	Hydraulic Filter.	23-9740

GM 345

1.	Air Filter.	27-7110
2.	Engine Oil Filter.	FL-400-A
3.	Fuel Filter.	FG795A
4.	Hydraulic Filter.	23-9740

Helpful Hints

1. Interlock switches.
   - Seat switch closed with operator in the seat.
   - Neutral switch closed when traction pedal is in neutral.
   - PTO switch closed when PTO is disengaged.

2. Bent mower blades should never be straightened, they should be replaced.

3. When servicing mower deck spindles replace bearings and bearing races as a set.

Review Questions

1. Engine oil should be change?

A. 1st 10 hrs then every 200 hrs.
B. 1st 50 hrs then every 100 hrs.
C. Every 200 hrs.
D. Every 100 hrs.

2. Normal engine oil will have a milky color.

A. True.
B. False.

3. Replace fuel filter (gas and diesel) every.

A. 200 hrs.
B. 100 hrs.
C. 400 hrs.
D. 1000 hrs.

4. Clean the spark arrestor muffler every.

A. 200 hrs.
B. 100 hrs.
C. 400 hrs.
D. 1000 hrs.

5. Hydraulic oil should be changed every.

A. 200 hrs.
B. 100 hrs.
C. 400 hrs.
D. 1000 hrs.

6. The correct oil in the rear drive axle is.

A. 30 wt engine oil.
B. 10wt hydraulic oil.
C. 80w 90 gear lube.
D. 140 w gear lube.

7. Safety switches should never be bypassed.

A. True.
B. False.

8. Bent mower blades can be straightened.

A. True.
B. False.

9. The inside spacer ring fits in a groove in the spindle.

A. True.
B. False.

10. If a rebuilt spindle turns tight you should.

A. Add extra grease and run in bearings.
B. Disassemble spindle and check bearing and spacers.
C. Loosen spindle-retaining nut and run in bearings.
D. Use old bearing spacers.

GROUNDSMASTER® 345 Maintenance Schedule

Minimum Recommended Maintenance Intervals:

Maintenance Procedure	Maintenance Interval & Service			
	Every 50hrs	Every 100hrs	Every 200hrs	Every 400hrs
Check Battery Fluid Level	*A Level Service*			
Check Battery Cable Connections				
Lubricate All Grease Fittings				
Lubricate Brake Cables				
Check Cutting Unit Gear Box Oil Level				
Clean Under Cutting Unit Belt Covers				
Check Cutting Unit Drive Belt Adjustment				
Check PTO Belt Adjustment				
Inspect Air Filter, Dust Cup, and Baffle				
‡ Change Engine Oil and Filter		*B Level Service*		
† Check Fan and Alternator Belt Tension				
Inspect Cooling System Hoses				
† Replace Transmission Oil Filter			*C Level Service*	
Service Air Filter				
Check Governor Oil Level				
Decarbon Spark Arrestor Muffler				
Check Rear Wheel Toe-In and Steering Linkage				
† Torque Wheel Lug Nuts				
Replace Fuel Filter				*D Level Service*
Change Transmission Oil				
Change Cutting Unit Gear Box Oil				
Replace Spark Plugs				
Pack Rear Wheel Bearings				
Torque Head, Adjust Valves, Check Engine RPM				
† Initial break in at 10 hours				
‡ Initial break in at 50 hours				
Replace Moving Hoses	**Annual Recommendations:** *Items listed are recommended every 1500 hours or 2 years whichever occurs first.*			
Replace Safety Switches				
Coolant System - Flush/Replace Fluid				

(See Operator's and Service Manual for specifications and procedures)

GROUNDSMASTER® 322-D and 325-D Maintenance Schedule

Minimum Recommended Maintenance Intervals:

Maintenance Procedure	Maintenance Interval & Service			
	Every 50hrs	Every 100hrs	Every 200hrs	Every 400hrs
Check Battery Fluid and Cable Connections Lubricate Grease Fittings Lubricate Brake Cables Check Cutting Unit Gear Box Oil Level Clean Under Cutting Unit Belt Covers Check Cutting Unit Drive Belt Adjustment Change Engine Oil Check PTO Belt Tension Inspect Air Filter, Dust Cup and Baffle	*A Level Service*			
‡ Replace Engine Oil Filter † Check Fan and Alternator Belt Tension Inspect Cooling System Hoses		*B Level Service*		
† Replace Transmission Oil Filter Service Air Filter Decarbon Spark Arrestor Muffler Check Rear Wheel Toe-In and Steering Linkage † Torque Wheel Lug Nuts			*C Level Service*	
Replace Diesel/Water Separator Filter Replace Electric Fuel Pump Filter Check Fuel Lines and Connections Change Cutting Unit Gear Box Oil Pack rear wheel bearings (2WD) Change Rear Axle Lubricant (4WD) Change Transmission Oil ‡ Torque Head, Adjust Valves, and Check RPM				*D Level Service*
† Initial break in at 10 hours ‡ Initial break in at 50 hours				
Replace Moving Hoses Replace Safety Switches Coolant System - Flush/Replace Fluid Fuel Tank - Drain/Flush	**Annual Recommendations:** *Items listed are recommended every 1500 hours or 2 years whichever occurs first.*			

(See Operator's and Service Manual for specifications and procedures)

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Commercial products

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